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Tryptophan content of purified milk proteins

Tryptophan analyses of milk proteins by the method of SPIES AND CHAMBERS have been published for β-lactoglobulin and whole casein[1], the principal components of casein[2], and α-lactalbumin[3]. Results of similar analyses on some newly purified milk proteins are presented here.

α-Casein and α_1-casein were prepared by MCMEEKIN, HIPP AND GROVES[4]; α_2- and α_3-caseins by HIPP, GROVES AND MCMEEKIN[5]; and "red protein" by GROVES[6]. The β-lactoglobulins AB, A, and B were crystallized by E. B. KALAN using the method of ASCHAFFENBURG AND DREWRY[7]. We wish to thank our colleagues for supplying us with samples of these proteins. Milk pseudoglobulin was prepared by SMITH's procedure[8].

The analyses were done on the proteins in solid form according to Procedure N of SPIES AND CHAMBERS[1]. The time for Reaction I was 7 h and for Reaction II 0.5 h. The results are listed in Table I. The figures are average percentages, with average deviations, followed by the number of individual determinations in parentheses. The results have been corrected for moisture but not for small amounts of ash.

TABLE I

TRYPTOPHAN CONTENT OF MILK PROTEINS

Protein	*Tryptophan* %
α-Casein	2.00 ± 0.03 (4)
α_1-Casein	2.13 ± 0.04 (4)
α_2-Casein	1.70 ± 0.06 (4)
α_3-Casein	1.81 ± 0.01 (4)
"Red Protein"	3.44 ± 0.10 (6)
β-Lactoglobulin AB	2.62 ± 0.02 (2)
β-Lactoglobulin A	2.65 ± 0.01 (2)
β-Lactoglobulin B	2.63 ± 0.05 (2)
Pseudoglobulin	3.81 ± 0.06 (3)

It is apparent from the data that the fractions of α-casein differ in tryptophan content with α_1-casein, the principal component, having a considerably higher amount than the minor components. The value of 2.0% for α-casein is lower than our previously reported figure of 2.2 % (ref. 2). We believe that the present preparation of α-casein[4] is purer than that analyzed years ago.

The different β-lactoglobulins contain the same amount of tryptophan and the analyses agree with the SPIES AND CHAMBERS figure of 2.57 % (ref. 1).

The figure of 3.8 % for pseudoglobulin is considerably higher than the 2.7 % found by SMITH *et al.*[9], but the methods of analysis differ. GROVES' "red protein" is also relatively rich in tryptophan.

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